BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

In the Matter of	)	
	)	
Wireless Telecommunications Bureau Seeks	)	
Comment on Request for Waiver of Television	)	WT Docket No. 06-18
Interference Rules by the State of New York to	)	
Implement a 700 MHz Public Safety	)	
Communications System	)	

To: The Commission

COMMENTS OF WFUT-TV

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SUMMARY

WFUT-TV, Newark, New Jersey ("WFUT") is a Spanish-language television station airing the programming of the Telefutura Network in the New York DMA. As noted in the Commission's Public Notice in this proceeding, the state of New York (the "State") has proposed to build a statewide wireless network system (the "SWN System") which it concedes will cause prohibited interference to a number of television stations, including WFUT, in violation of Section 90.545 of the Commission's Rules. The State therefore seeks a waiver of Section 90.545's prohibition on land mobile interference to television stations. It attempts to justify that waiver through an engineering study, as required by Section 90.545, which it asserts demonstrates that its proposal "will not cause significant interference to off-air television reception." Unfortunately, that is not the case.

The Engineering Study upon which the State's Waiver Request relies is fatally flawed, as it does not comply with the requirements for such studies under Section 90.545. First and foremost, the State's Engineering Study analyzed the wrong transmitter site for WFUT. It therefore failed to examine the interference the SWN System will cause to WFUT's existing facilities, and to WFUT's authorized future facilities, as is required by Section 90.545. The Waiver Request is therefore fundamentally defective and subject to dismissal.

Even were that not the case, however, the State's Engineering Study utilizes an undisclosed methodology which it asserts should be accepted as being "consistent" with that used in two prior Commission waiver decisions involving land mobile interference. Whether or not the State's Engineering Study is consistent with the methodology used in those earlier cases is irrelevant here, as both of those decisions involved only "fixed-into-fixed" interference analysis, and not the "mobile-into-fixed" interference at issue here, where the interfering

transmission sources are both mobile and numerous. The State's attempt to apply this methodology in the mobile-into-fixed context is entirely novel, as it was never designed for such application and has never been approved by the Commission for such application.

Further complicating matters is the fact that it is impossible for the Commission or anyone else to assess the accuracy of the State's interference analysis, as the Waiver Request fails to disclose various critical assumptions, calculations, and just plain basic information necessary to replicate the State's study. Without this information, there is no way or even to check the State's math to determine whether the calculations were performed correctly, whether consistent units were used, or what D/U ratios were utilized.

Finally, in seeking to downplay the extent of the interference to WFUT, the Waiver Request categorically excludes from its interference analysis **99.2 %** of the population within WFUT's Grade B contour. Given that the Waiver Request simultaneously asserts that the SWN System should be allowed to cause interference to up to 2% of the population within a station's Grade B contour, the Waiver Request effectively urges the Commission to eliminate Section 90.545's prohibition on interference entirely. By excluding from consideration 99.2% of a station's viewers, interference to every last one of the remaining 0.8% would, by the State's definition, only be *de minimis* interference, and therefore entirely acceptable. That is clearly not correct.

For these and the numerous other reasons discussed in WFUT's Comments, the Waiver Request should be dismissed or denied or, in the alternative, considered only as part of a broader proceeding aimed at establishing an accurate and reliable methodology of general applicability for assessing and addressing interference between land mobile and television facilities.

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To: The Commission

COMMENTS OF WFUT-TV

WFUT-TV, Newark, New Jersey ("WFUT"), a Spanish-language station airing the programming of the Telefutura Network in the New York DMA, by its counsel, hereby submits its Comments in response to the Commission's Public Notice in the above-captioned proceeding (the "Public Notice).[1] The Public Notice was issued in response to an October 24, 2005 filing by the state of New York (the "State") styled as a "Request for Waiver of Section 90.545 Regarding 700 MHz Public Safety System Interference Protection for Co-Channel and Adjacent Channel Television Stations" (the "Waiver Request"). The Waiver Request is necessitated by the State's admission that its proposed statewide wireless network system (the " SWN System") will cause prohibited interference to WFUT and other television stations in violation of Section 90.545 of the Commission's Rules. While the Commission's rules may generally be waived where there is "good cause" to do so,[2] it is incumbent upon the party seeking a waiver to plead *with*

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1 *Wireless Telecommunications Bureau Seeks Comment on Request for Waiver of Television Interference Rules by the State of New York to Implement a 700 MHz Public Safety Communications System*, FCC 06-99, 21 FCC Rcd 336 (Jan. 26, 2006).

2 *See, e.g., Northeast Cellular Telephone Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990) ("*Northeast Cellular*"); *WAIT Radio v FCC*, 418 F.2d 1153, 1157-59 (D.C. Cir. 1969) ("*WAIT Radio*").

particularity the facts and circumstances that would make the general rule inapplicable.[3] As the U.S. Court of Appeals for the D.C. Circuit has stated, "an applicant for waiver faces a high hurdle even at the starting gate."[4] Here, the State has failed to take the steps necessary to even place its Waiver Request at that starting gate, much less to overcome the high hurdle.[5] Accordingly, its Waiver Request must be dismissed or denied.

I. THE WAIVER REQUEST FAILS TO COMPLY WITH THE COMMISSION'S INTERFERENCE ANALYSIS REQUIREMENTS UNDER SECTION 90.545 AND IS THEREFORE SUBJECT TO DISMISSAL WITHOUT CONSIDERATION

A. The Waiver Request's Study of Interference to WFUT Is Based on the Wrong Transmitter Site

The State has requested a waiver of Section 90.545's "no interference" restriction, relying on an engineering study of interference to television stations (the "Engineering Study") provided pursuant to Section 90.545(c)(1)(ii). That provision of the Commission's Rules establishes the ways in which applicants may demonstrate that they will not cause interference to TV or DTV operations, one being to submit an engineering study showing no interference. While the State

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[3] *See Tucson Radio, Inc. v. FCC*, 452 F.2d 1380, 1382 (D.C. Cir. 1971); *WAIT Radio*, 418 F.2d at 1157.

[4] *WAIT Radio*, 418 F.2d at 1157.

[5] The State seeks a waiver pursuant to Section 1.925(b)(3) of the Commission's Rules. *Waiver Request* at 1, 16. Section 1.925(b)(3) states that the Commission:

> may grant a request for waiver if it is shown that: (i) The underlying purpose of the rule(s) would not be served or would be frustrated by application to the instant case, and that a grant of the requested waiver would be in the public interest; or (ii) In view of unique or unusual factual circumstances of the instant case, application of the rule(s) would be inequitable, unduly burdensome or contrary to the public interest, or the applicant has no reasonable alternative.

Waiver requests pursuant to Section 1.925, however, require a fee set forth in Section 1.1102 of the Commission's Rules and "must be filed on FCC Form 601, 603, or 605." 47 C.F.R. §§ 1.925(a), 1.925(b), 1.1102; *see Delta Radio, Inc.*, 18 FCC Rcd 16889, 16891 n.18 (2003) ("Delta did not file its waiver request on one of these forms, nor did it pay a fee"). It does not appear that the State has complied with either of these two requirements for the waiver it requests and the Waiver Request is defective for this additional reason.

concedes that it is unable to demonstrate its proposal will cause no prohibited interference,[6] it submits the engineering analysis to support its assertion that interference to WFUT and other stations will not be significant, and therefore should not be considered fatal to its waiver request.

However, the engineering study called for by Section 90.545(c)(1)(ii) must be "based on . . . the parameters, including authorized and/or applied for facilities, of the TV/DTV station(s) it is trying to protect." 47 C.F.R. § 90.545(c)(1)(ii). The engineering study submitted by the State, however, utilizes outdated parameters for WFUT that do not reflect either the station's current operation or its authorized new facilities. As the State has failed to submit any engineering analysis regarding the SWN System's interference impact upon WFUT's current or authorized new facilities to support its Waiver Request, the Commission has no basis for assessing the extent of that interference or whether justification might exist to waive the interference prohibition.

As discussed in the attached WFUT Engineering Exhibit, the State's Engineering Study erroneously uses FCC File No. BLCT-19950901KG as its analysis facilities for WFUT. Those facilities represent WFUT's licensed operating facilities prior to the destruction of the World Trade Center, when WFUT operated with an antenna mounted at the very top of the mast of the Empire State Building. However, as a result of the many broadcast facilities that were displaced from the World Trade Center to the Empire State Building, the broadcast facilities atop the Empire State Building had to be completely restructured to make room for the new broadcast tenants. The result of that process was the removal of WFUT's antenna from atop the mast, and the relocation of WFUT's operations to its auxiliary antenna at the 4 Times Square building in New York City, where it has been operating since 2004. WFUT has obtained a construction

[6] Waiver Request at 10.

permit to build a new facility on the Empire State Building. However, because of the lack of space, its antenna will no longer be mounted atop the mast, but installed in a lower sidemounted position in a shared aperture space.[7] As a result, WFUT-TV has not been in service from the Empire State Building since 2004 and will never be able to operate from that site with its pre-9/11 licensed facilities.

Because of the complexities of constructing new facilities in that extremely crowded broadcast environment, WFUT-TV has not been able to commence operations under its construction permit at the Empire State Building site and therefore continues to operate from its authorized auxiliary (backup) facility (BXPCT-20031216ADS) at the 4 Times Square building. A license application for the auxiliary facility is pending. Once the new installation at the Empire State Building can be completed and tested, WFUT will be able to determine whether to license its operation on the Empire State Building as its primary antenna, or to establish its primary facility at 4 Times Square and license the new Empire State Building facility as its auxiliary facility. In either case, both sites will continue to be used, with one serving as the backup facility. Unfortunately, the State failed to perform an interference analysis for *either* of these authorized facilities. As a result, the Waiver Request is fundamentally defective and cannot be granted by the Commission.

B. The Waiver Request Claims to Use "Standard" Methodology in a Context Where It Is Neither Standard Nor Appropriate

The State's Waiver Request asserts that "the Engineering Study uses *standard interference procedures* to determine the percentage of population affected within each relevant

[7] Engineering Exhibit at 1-2.

television station's service area (Grade B contour)."[8] However, it fails to point to a single instance where its analysis has been accepted in such a novel and, indeed, inappropriate context.

The interference at issue here is that which will be caused to a fixed broadcast station where the interfering transmission sources are both mobile and numerous ("mobile-into-fixed" interference). However, the only two cases cited in the Waiver Request to support its interference analysis, *Aloha Partners, L.P.* and *Access Spectrum, LLC*, both involved *fixed-into-fixed* interference analysis, rendering false the Waiver Request's statement that "[t]he analysis contained in the Engineering Study is consistent with that used by the Commission in Aloha Partners, L.P."[9] The analysis itself may or may not be consistent with *Aloha Partners*, but the context in which the State attempts to apply it is entirely different. There is nothing "standard" about applying a form of analysis to interference relationships for which it was never designed and to which it has never previously been applied.

Even in the fixed-into-fixed environment of *Aloha Partners*, the Commission hedged its bets as to the reliability of the analysis the Waiver Request claims to have used, explicitly conditioning the waiver on the applicant "cur[ing] any instances of actual interference to service to [the television stations'] viewers that may occur at its own expense . . . ."[10] Similarly, in the only other cased cited by the State on this point, *Access Spectrum*, the Commission required the applicant there to "remedy any and all interference at its sole expense."[11]

Obviously, the Commission was sufficiently concerned about the accuracy and reliability of the interference analysis in those cases (upon which the Waiver Request here claims to rely)

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8 Waiver Request at 11 (emphasis added).

9 Waiver Request at 11 n.16.

10 *Aloha Partners, L.P.*, 20 FCC Rcd 3744, 3751 (WTB 2005).

11 *Access Spectrum, LLC*, 19 FCC Rcd 15545, 15552-53 (WTB 2004).

that it imposed these conditions to protect the public. The Commission was apparently willing to grant those waivers on the theory that, at least in the fixed-into-fixed context, such "no interference" conditions could serve as "safety valves" to eliminate interference that the analysis should have predicted, but failed to do so. Unfortunately, such conditions would be of little help in the *mobile-into-fixed* environment, where the sources of interference are constantly moving and changing, making it nearly impossible for a viewer to identify the source of interference or for any effective curative measures to be implemented. As a result, the risk of relying on such analysis is much greater here, where the form of analysis being applied was never designed to assess mobile-into-fixed interference, and there are no practical steps that can be taken to mitigate the harm to the public when interference does occur.

C. The Waiver Request Fails to Provide the Information Necessary for the Commission to Assess the Accuracy or Reliability of Its Numerous Unstated Assumptions, Calculations, and Methodology

While the failure to assess interference to WFUT's current authorizations is both fundamental and fatal to the Waiver Request, even if the State had examined the appropriate facilities, the interference analysis would still be of little use to the Commission. As noted in the assessment of the State's Waiver Request by Consulting Engineers Hatfield & Dawson attached hereto,

> [w]hat the State has provided is simply a "black box" with a flow chart printed on the side. The technical data is input in one end, and out the other end comes a determination of interference or lack thereof. But what is going on inside the box? While we know that the inner workings apply Longley-Rice techniques to the broadcast station and free-space techniques to the mobile radios, we know little else about their analysis.[12]

Hatfield & Dawson's Engineering Statement proceeds to discuss various critical assumptions, calculations, and just plain basic information necessary to assess the State's analysis, but on

[12] Engineering Exhibit at 5.

which the Waiver Request is entirely silent.[13] Lacking such fundamental information, it is impossible for the Commission or anyone else to replicate the State's study, or even to check the State's math to determine whether the calculations were performed correctly, whether consistent units were used, or even what D/U ratios were utilized.[14] This silence is particularly disturbing given that the "fixed-into-fixed" waiver applicants in *Aloha Partners* and *Access Spectrum* were far more forthcoming about this information in their waiver requests.[15]

While analytical transparency is always critical to permitting the Commission and others to precisely assess the accuracy, reliability, and usefulness of an engineering study, full and complete disclosure of the methodology employed in the State's Engineering Study is particularly important in this proceeding for two additional reasons.

First, the State seeks to apply some form of undisclosed engineering analysis apparently designed for "fixed-into-fixed" interference situations in the entirely novel context of "mobile-into-fixed" interference scenarios, forcing the Commission to assess not just the results claimed by the Waiver Request, but whether the methodology that produced those results makes any sense.

Second, in reviewing the "Authors' Credentials" appended to the State's Engineering Study, WFUT notes that none of the authors of the Engineering Study purports to have any experience in assessing the interaction between television broadcast and land mobile facilities.[16] While each of the authors may be qualified in their particular fields, nothing in their credentials indicates that they have the necessary qualifications or experience to conduct the complex

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13 Engineering Exhibit at 5-21.

14 *Id.*

15 *Id.* at 7.

16 Engineering Study at 73.

analysis necessary here, particularly when the lack of information in the State's Engineering Study effectively demands that the Commission just "take their word for it" that there will not be objectionable interference.[17]

To be clear, WFUT is not implying that the authors are *per se* unqualified to conduct this type of interference analysis, as both it and the Commission have not been provided with sufficient information to make such an assessment. However, that very fact makes it critical that their methodology be completely transparent so that any inadvertent errors, assumptions, or miscalculations can be identified by the Commission and other parties before they result in unintended harm to broadcast stations and the public.

In short, the State's Engineering Study is fatally flawed by bad data and a hidden methodology that may well use erroneous techniques and assumptions, generating meaningless results. The Commission knows no more about the extent of the interference the State's proposal would cause WFUT (or other stations) than it did before the Waiver Request was filed. The State has therefore failed to present the Commission with even the basic information necessary for the Commission to consider a waiver request, much less the rigorous engineering analysis necessary to clear the "high hurdle" faced by waiver applicants.

D. Even If the Correct Interference Methodology Had Been Applied, Using "Standard" Assumptions Rather Than WFUT's Actual Operating Parameters Renders Any Interference Analysis Meaningless

As the Waiver Request itself states, "Section 90.545(c) allows land mobile licensees to satisfy the interference criteria through several methods, including submission of an engineering study justifying the proposed separations based on the actual parameters of the land mobile

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17 *Id.*

station and *the actual parameters of the television stations to be protected*."[18] As detailed above, the State completely failed to study the "actual parameters" of WFUT's current and authorized operations. Even with regard to the station's now-defunct licensed operation, the State's Engineering Study does not disclose sufficient information to confirm that it did indeed incorporate all of the station's actual parameters.

For example, the State may well have used OET-69 assumptions in performing its calculations that do not match WFUT's "actual parameters." As discussed in detail in the attached Engineering Exhibit, use of OET-69's standard assumptions regarding WFUT's vertical plane radiation pattern, or the beam tilt of its antenna, would by themselves create substantial errors in any assessment of interference to the station.[19] In fact, utilizing just these erroneous assumptions would have caused the State's Engineering Study to overstate WFUT's power levels in some areas by as much as **12 dB**, undermining entirely any effort to accurately assess the D/U ratios that would cause interference.[20]

An otherwise sound engineering study incorporating these flawed assumptions would significantly overestimate WFUT's signal strength (and therefore its resistance to interference) in areas containing **4,000,000** people (for WFUT's current operation) and **3,400,000** people (for WFUT's construction permit operation).[21] The broad geographic impact and severity of such an error is illustrated in the two signal strength maps included in WFUT's Engineering Exhibit, attached hereto.

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18 Waiver Request at 9 (emphasis added).

19 Engineering Exhibit at 10-17.

20 *Id.* at 15.

21 *Id*. at 16.

So what assumptions did the State's Engineering Study make with regard to these variables? Did it use the station's actual parameters, the OET-69 assumptions, or some other set of assumptions? As discussed above, it is impossible to know, as none of that information is disclosed in the Waiver Request.

These are not isolated examples of small changes in analysis having an immense impact on the results. WFUT's Engineering Exhibit discusses numerous other erroneous assumptions that might well have been incorporated in the State's analysis that would significantly distort the results, but once again, the Commission has no way of knowing what assumptions were made by the State's Engineering Study, as it simply does not say.[22]

II. THE WAIVER REQUEST'S EFFORT TO INVOKE THE INAPPLICABLE 2% *DE MINIMIS* INTERFERENCE STANDARD FOUND IN SECTION 73.623(C) MUST BE REJECTED

Conceding that it cannot meet Section 90.545's requirement that its SWN System cause no interference to local television stations, the State urges the Commission to "import" Section 73.623(c)'s 2% *de minimis* interference threshold into the land mobile context.[23] However, the 2% *de minimis* standard was intended to serve a limited purpose and the Commission has wisely rejected attempts to expand its reach to applications for which it was never designed. In 2004, the Commission expressly rejected proposals to allow digital LPTV and translator stations to cause 2% interference to full-service TV stations, stating:

> Further, it would be inappropriate to allow these secondary service stations to be authorized on the basis of the full-service DTV de minimis criteria (2%/10%) to determine unacceptable predicted interference to full-service analog and DTV stations. Instead we conclude that the tolerance we have established elsewhere for "no interference" (being less than 0.5%) is an appropriate standard here. In the full-service context, the benefit offsetting the loss of service to interference was the flexibility to construct DTV stations more quickly in order to start the

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22 Engineering Exhibit at 4-21.

23 Waiver Request at 13-15.

> DTV transition and, in most cases, the ability to provide new DTV service to a substantially larger number of viewers.[24]

In other words, the Commission limited use of the extraordinary 2% interference limit to the situation where gain and loss within the full-power broadcast service would balance out or actually expand such service to the public. In the instant situation, the State seeks to cause interference to broadcast service in order to accomplish an objective unrelated to replacing the broadcast service lost.

The two Commission actions cited by the State where the Commission did adopt a 2% *de minimis* interference standard are inapposite here. In the first instance, the Commission merely continued its established practice of allowing one full-service TV station to cause *de minimis* interference where doing so was necessary to effectuate the DTV transition.[25] In its efforts to navigate the complicated process of setting a final DTV table of allotments, the Commission found it necessary to allow full-service TV stations with out-of-core digital channels to elect their in-core NTSC channel as their permanent DTV channel even if doing so would cause more than 0.1% but less than 2% interference to another full-service television broadcast station.[26] Indeed, the Commission used language that emphasized the unusual nature of permitting such interference: "licensees must notify us in writing that they are eligible for and *wish to take advantage of this special treatment*."[27]

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[24] *Amendment of Parts 73 and 74 of the Commission's Rules to Establish Rules for Digital Low Power Television, Television Translator, and Television Booster Stations and to Amend Rules for Digital Class A Television Stations,* 19 FCC Rcd 19331, 19367 (2004).

[25] *Public Notice, DTV Channel Election: First Round Conflict Decision Extension and Guidelines for Interference Conflict Analysis,* 20 FCC Rcd 13415 (MB 2005).

[26] *Id.* at 13417.

[27] *Id.* (emphasis added).

The second instance cited in the Waiver Request involved voluntary band-clearing agreements by full-service TV stations agreeing to accept interference from non-television licensees.[28] Obviously, permitting a station to voluntarily agree to accept interference is far different than imposing interference on a station against its wishes. Section 90.545 explicitly rejects such an approach, requiring land mobile operators to demonstrate through engineering analysis that no interference to television stations will occur, ***or*** to "obtain written concurrence from the applicable TV/DTV stations(s)."[29] Suggesting that, because television stations may voluntarily agree to receive 2% interference, land mobile operators should be free to cause stations 2% interference without their consent, would make Section 90.545 nonsensical. The Waiver Request presents no basis for the Commission to merely ignore the plain language of Section 90.545.

III. LIKE THE STATE'S ENGINEERING STUDY, THE WAIVER REQUEST SUFFERS FROM INCORRECT DATA AND ASSUMPTIONS THAT SEEK TO OBSCURE THE INTERFERENCE IMPACT ON WFUT

The State's Engineering Study leaves the Commission without any idea as to how much interference will actually be caused to WFUT by the State's proposal, and therefore provides no basis for the Commission to be able to consider the waiver the State requests. In light of that fact, there is little reason to dwell at length upon the Waiver Request's efforts to further extrapolate from that faulty data a lack of interference harm to WFUT and other stations. However, WFUT believes it important to note that the Waiver Request itself generates additional flawed calculations aimed at downplaying the extent and impact of the interference caused.

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[28] *Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules; Carriage of the Transmissions of Digital Television Broadcast Stations; Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, 16 FCC Rcd 2703 (2001).

[29] 47 C.F.R. § 90.545(c)(1)(ii)-(iii).

These skewed claims regarding "relevant" interference need to be rejected now, lest they confuse later efforts by the State to provide the Commission with more useful interference analysis.

The State's Engineering Study indicates that the proposed SWN System will cause interference to **33,449 viewers**.[30] While we now know that this figure, which is based upon applying the State's interference methodology to WFUT's prior broadcast facilities, is not useful in the real world, it is the starting point for the Waiver Request's contorted calculation which ultimately claims that only 92 households would actually be affected by the interference.[31] Like the Engineering Study's "black box" approach, however, the Waiver Request fails to show its math or demonstrate the logic of its method of calculation. It merely cites a number of statistics (which it turns out are themselves inaccurate) and then announces that only 92 households will be harmed by interference, leaving the reader to wonder what happened to the other 33,000 people.

The entirety of the State's discussion of the point states that:

> Even for WFUT-TV, Newark, NJ, a New York City area station with a service area of over 16 million households, the numbers of those actually impacted are *de minimis*. WFUT-TV reaches a total of 1,154,090 households according to the *TV & Cable Factbook*, of which 486,850 are non-cable households. However, the station is actually viewed over-the-air on a weekly basis in just 46,105 households. The State's radio system has a theoretical impact on just 0.02% of WFUT's viewers, which means that only 92 households might be impacted.[32]

As an initial point, while that service area statistic is now out of date as it represents the station's prior facilities, the State's own Engineering Study indicates a population of 16.5 million

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30 Engineering Study at 26.

31 Waiver Request at 12.

32 Waiver Request at 12.

people,[33] not, as the Waiver Request indicates, 16 million *households*.[34] This is the type of unintentional transposition of measuring units that caused Hatfield & Dawson to urge in the attached Engineering Exhibit that the State disclose its actual interference calculations so that they could be checked to ensure no similar mistakes tainted the results.[35]

Next, the number that the State cites as the number of households WFUT "reaches" (1,154,090) is a number it obtained from the 2005 Television & Cable Factbook,[36] but which is plainly incorrect. In fact, even the more current 2006 Television & Cable Factbook reports that number as 4,248,640,[37] almost four times higher. The other numbers cited in the Waiver Request from the 2005 edition are also severely understated. In comparison to the 2005 data cited by the State, the 2006 Television & Cable Factbook reports 898,000 (compared to 486,850 in the 2005 edition) non-cable households and an average weekly circulation of 129,112 (compared to 46,105 in the 2005 edition) in non-cable households.[38]

The Waiver Request then continues this trend of convenient understating of numbers, indicating that "the State's radio system has a theoretical impact on just 0.02% of WFUT's viewers." However, the State's own Engineering Study indicates the interference percentage is not 0.02%, but 0.20%.[39] As a result, even if every other data and mathematical error could be ignored, the Waiver Request still understates the extent of the interference by a factor of 10. Thus, even in the State's own example, it would not be 92 pure over-the-air/frequent viewer

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33 Engineering Study at 26.

34 Waiver Request at 12.

35 Engineering Exhibit at 23.

36 2005 TELEVISION & CABLE FACTBOOK A-1433.

37 2006 TELEVISION & CABLE FACTBOOK A-1462.

38 *Id*.

39 Waiver Request at 12; Engineering Study at 26.

households that would suffer interference, but 920 such households, representing approximately 2500 people that meet the State's unreasonably narrow criteria for being considered a harmed viewer.

However, there is absolutely no legal basis for the Waiver Request's self-serving analysis of which viewers should be deemed harmed by interference. The Waiver Request presents no Commission precedent to justify its categorical exclusion of 99.2%[40] of the population within WFUT's Grade B contour from interference analysis based on its claim that they do not live in purely over-the-air households *and* watch WFUT weekly. As discussed below, interference is harmful to any viewer that might tune in to the station, not just "regular viewers",[41] and significant over-the-air viewing does indeed occur in cable and satellite households. Beyond

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[40] This percentage is derived by taking the Waiver Request's claimed 46,105 households that regularly watch WFUT over-the-air, multiplied by the average number of persons per household in the New York DMA (2.7), divided by 16,559,089, the population in the Grade B contour of the station according to the State's Engineering Study. The result of this calculation is 0.8%, which means that interference to the other 99.2% of the Grade B contour population was deemed irrelevant by the Waiver Request.

[41] The Waiver Request seeks to downplay the impact of the interference caused to WFUT by incorrectly asserting that "each of these stations has a very limited number of actual viewers . . . ." Waiver Request at 11. However, Nielsen data indicates that **17.1%** of the viewers in the *entire* New York DMA regularly watch the station, with that percentage presumably being higher within the station's Grade B contour, and higher still with regard to special events like the broadcast of the World Cup. Nielsen Media Research, Metered Sample Ratings Report, New York Local People Meter NSI, November 2005. At a minimum, that means that 3,405,280 viewers are regularly watching the station, of which 1,927,388 (56.6%) have over-the-air televisions.

In addition, the percentage of over-the-air viewing of WFUT's Spanish-language network programming is likely higher than the New York DMA average, as Spanish-language stations with large Hispanic audiences tend to have significantly higher over-the-air viewing than English-language stations. *See* Federal Communications Commission, Media Bureau, Staff Report Concerning Over-the-Air Viewers, MB Docket No. 04-210, (Feb. 28, 2005) at 5 ("Commenters state that analog OTA households are somewhat disproportionately African-American, Hispanic, and low-income.").

these facts, however, the Commission's statutory mandate is to protect the continued *availability* of broadcast services to the public, and there are powerful public policy reasons for doing so.[42]

When ABC's New York station was knocked off the air by the destruction of the World Trade Center, WFUT allowed ABC to air its news and other programming on WFUT's facilities, ensuring English-language viewers continued access to news and information when it was most critical.[43] A waiver permitting the State to cause interference to WFUT premised on the impact being limited to the Station's minority viewers would have been short-sighted and harmful to other viewers throughout New York in those circumstances. However, the State now urges the Commission to categorically ignore interference to such viewers when assessing the waiver's harm to the public.

Similarly, there is no rational basis for categorically excluding from interference analysis all television households that subscribe to cable or satellite television services, and therefore counting as potentially harmed only those households that watch nothing but over-the-air television.[44] While such a methodology might generate the interference result desired by the State, that result would be meaningless for a number of reasons. First, many satellite television households do not pay extra to receive their local broadcast signals over satellite, and instead continue to rely on over-the-air reception for their local signals, just as they did before local station signals were available by satellite. Second, both cable and satellite television households often have additional "rabbit ear" sets scattered around the home that are not connected to the cable or satellite service and which rely exclusively on over-the-air reception. This is

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42 *See* 47 U.S.C. §§ 151; 303(f); 307(b).

43 Michael Grotticelli, *After the collapse, stations struggle,* BROADCASTING & CABLE, Sept. 17, 2001 at 20 (At the time, the station's call sign was WHSE-TV.)

44 Waiver Request at 12.

particularly common in Hispanic households, which are larger on average[45] and tend to be multi-generational,[46] making use of "bedroom sets" with rabbit ear antennas even more common.[47]

Thus, even if the Commission were to capitulate to the State's demand that it ignore interference to viewers that do not have an over-the-air television, the number of potentially affected viewers would still be staggering. At WFUT's current site at 4 Times Square, the station's Grade B contour encompasses over 17.5 million people, with that number rising to over 18 million people based upon its authorized new facilities.[48] According to Nielsen data, in the New York DMA, well over half—56.6% to be precise—of the population has one or more purely over-the-air sets in their home.[49] This includes both those who have only over-the-air sets, as well as those who have cable or satellite service but who also have one or more over-the-air sets in their home. However, the percentage of viewers receiving over-the-air programming is actually higher than 56.6%, as this figure does not count satellite households with televisions connected to *both* satellite and an over-the-air antenna unless they also have a *purely* over-the-air set.

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45 In the New York DMA, Hispanic households average 3.2 persons per household, while Non-Hispanic households average 2.6 persons per household, with the market as a whole averaging 2.7 persons per household. Nielsen Media Research 2005 Universe Estimates, New York DMA.

46 *Preparing Consumers for the End of the Digital Television Transition, Before the Subcommittee on Telecommunications and the Internet of the House Committee on Energy and Commerce 109th Cong.* (2005) (statement of Mr. Manuel Mirabal, Founder and Co-Chair of the Hispanic Technology and Telecommunications Partnership).

47 One of the reasons such rabbit ear sets are common among cable subscribers is that despite the Waiver Request's assumption to the contrary, WFUT is not carried on all New York DMA cable systems, and cable subscribers wishing to watch the station may have no choice but to use an over-the-air set to view WFUT. For this additional reason, it is improper for the Waiver Request to simply declare that interference is irrelevant to cable subscribers.

48 Engineering Exhibit at 2 nn.1 & 2.

49 Nielsen Media Research, Metered Sample Ratings Report, New York Local People Meter NSI, November 2005.

Even using the 56.6% figure reveals that **9,905,692 viewers** (56.6% of the 17,501,222 viewers within the Grade B contour of WFUT's current operation) are subject to being harmed by over-the-air interference. The number of viewers potentially harmed is greater still for WFUT's authorized new facilities, with **10,201,138 viewers** (56.6% of the 18,023,212 viewers within the Grade B contour of WFUT's authorized new operation) subject to harm from over-the-air interference.

In reality, however, the number of viewers potentially affected by over-the-air interference is higher still, as many cable systems that carry WFUT retransmit the station's over-the-air signal as received on an antenna at the system's local headend. To the extent that interference from the State's mobile transmitters interferes with that headend's reception of the WFUT signal, the interference impacts all of that system's subscribers, including those who have *no* over-the-air televisions. Moreover, as discussed above, the likely intermittent nature of such mobile-into-fixed interference would make it extremely difficult to diagnose and remedy.

Because it is nearly impossible to theoretically quantify the impact of such cable headend interference, WFUT will not attempt to include it in the calculation here, but the significant adverse impact from such headend interference should not be ignored in assessing the harm to the public of the State's proposal.

Thus, setting headend interference aside, between 9.9 and 10.2 million people within WFUT's Grade B contour are subject to direct harm from over-the-air interference. It is impossible to say what percentage of these viewers might receive interference from the proposed SWN System until the State is able to conduct a more useful engineering analysis. However, even applying for the sake of argument the flawed figure from the State's current Engineering Study (which suggests that interference will be caused to 0.2% of WFUT's Grade B contour

population), that is over 35,000 people, of which nearly 20,000 have one or more over-the-air sets. Whatever the actual number of viewers harmed might be, it is obviously a far cry from the 92 households claimed in the Waiver Request, and a clear indication that better engineering analysis is essential to any serious consideration of the Waiver Request.

IV. THE MANY ISSUES RAISED BY THE STATE'S WAIVER REQUEST DEMONSTRATE THE NEED FOR A BROADER PROCEEDING TO DETERMINE THE APPROPRIATE STANDARDS FOR ASSESSING AND ADDRESSING INTERFERENCE BETWEEN TELEVISION AND LAND MOBILE FACILITIES

The State's Waiver Request raises myriad complex technical, policy, and legal issues; issues that cannot be adequately addressed in the relative vacuum of an individual waiver proceeding. Going forward through ad hoc action on individual waiver requests disserves all parties, and ignores the fundamental need to create a uniform technical approach and standards that will promote good planning and prevent interference in what is admittedly a novel area of interference analysis. Accepting the State's invitation to graft an unknown and untested method of interference analysis onto such waiver requests not because it accurately determines the extent of interference created, but because it is "handy" or produces the State's desired result, is poor policy and an invitation to technical chaos.

Instead, as suggested by the Public Notice,[50] the Waiver Request needs to be considered in a broader context where the Commission may assess and design, with input from numerous parties, a methodology to accurately determine the extent of interference between such broadcast and land mobile operations. Such a proceeding would establish the appropriate thresholds for prohibited interference, as well as consider how to best mitigate interference, particularly in the "mobile-into-fixed" environment.

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[50] Public Notice at 2.

Such a proceeding could be promptly initiated as an entirely separate docketed proceeding or conducted as part of a consolidated proceeding including consideration of Qualcomm Incorporated's Petition for Declaratory Ruling (the "Qualcomm Petition"),[51] which raises many of the same issues as the Waiver Request here. The Qualcomm Petition seeks, *inter alia*:

> (1) clarification that Office of Engineering and Technology Bulletin No. 69, "Longley-Rice Methodology for Evaluating TV Coverage and Interference" (OET-69) is an acceptable basis for demonstrating compliance with Section 27.60 of the Commission's Rules; (2) declaratory ruling that that [sic], for purposes of making engineering showings pursuant to Section 27.60(b)(1)(iii), predicted interference to not more than two percent of the population served by a TV/DTV station is *de minimis* and therefore acceptable . . . .[52]

The Waiver Request here also asks the Commission to (1) endorse a type of Longley-Rice methodology as a sound basis for interference analysis in this novel application, and (2) adopt Section 73.623(c)'s 2% *de minimis* interference standard as a reasonable benchmark for evaluating its request for a waiver of Section 90.545. As the major issues raised by the State's Waiver Request are substantially similar to those raised in the Qualcomm Petition, consolidation of the two proceedings seems a reasonable and efficient approach.

Whether launched as a new proceeding or a consolidated proceeding, the benefits include establishing a durable and uniform standard for assessing mobile-into-fixed (broadcast) interference analysis that all interested entities—broadcasters, commercial service providers, public safety agencies, the Commission, and the public—can rely on with confidence. Such an approach is vastly superior to addressing these issues in a piecemeal fashion, which is neither

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51 *See Pleading Cycle Established for Qualcomm Incorporated Petition for Declaratory Ruling*, *Public Notice*, WT Docket No. 05-7, 20 FCC Rcd 1293 (WTB 2005).

52 Public Notice at n.5.

administratively efficient, nor likely to result in a cohesive and durable policy.[53] As the Commission has stated, "we believe that any change in how land mobile/TV protection is calculated should be addressed in a proceeding which looks at all spectrum shared between these services rather than one limited to a particular service band."[54] A review of the Waiver Request here demonstrates the wisdom of that broader course of action.

CONCLUSION

Among other flaws, the Waiver Request fails to analyze the interference impact of its proposed SWN System on WFUT's currently authorized operations, fails to provide the Commission with adequate information to assess the accuracy or reliability of its interference analysis, and fails to present any basis for its categorical exclusion of 99.2% of the population within WFUT's Grade B contour from its interference analysis. The Waiver Request should therefore be dismissed or denied or, in the alternative, considered only as part of a broader

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53 47 U.S.C. § 154(j) ("The Commission may conduct its proceedings in such a manner as will best conduce to the proper dispatch of business and to the ends of justice."); *see, e.g., 1998 Biennial Regulatory Review – Review of Depreciation Requirements for Incumbent Local Exchange Carriers; Ameritech Corporation Telephone Operating Companies' Continuing Property Records Audit, et. al.; and GTE Telephone Operating Companies Release of Information Obtained During Joint Audit*, 15 FCC Rcd 6588, 6590 n.9 (2000) ("Because the issues presented in the Commission's biennial review proceeding and the petition for forbearance of depreciation requirements filed by the United States Telephone Association raised similar issues, we consolidated our review of the proceedings."); *BellSouth Corporation BellSouth Telecommunications, Inc. Southwestern Bell Telephone Company Pacific Bell. Nevada Bell; Applications for Review of Responsible Accounting Officer Letter 26*, 1999 FCC LEXIS 3312 (1999) ("We have consolidated these applications for administrative convenience because they present similar issues."); *Petition of Bell Atlantic for Relief from Barriers to Deployment of Advanced Telecommunications Service*s, 13 FCC Rcd 5179, ¶ 3 (CCB 1998) (consolidating three petitions for forbearance that raised "certain similar issues").

54 *The Development of Operational, Technical and Spectrum Requirements For Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010; Establishment of Rules and Requirements For Priority Access Service*, Second Memorandum Opinion and Order, 15 FCC Rcd 16844, 16860 (2000).

proceeding aimed at establishing an accurate and reliable methodology of general applicability for assessing and addressing interference between land mobile and television facilities.

Respectfully submitted,

WFUT-TV

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Engineering Statement
In Support of
Comments in WT Docket No. 06-18
Regarding the State of New York's Request for Waiver

Prepared for
WFUT-TV Newark, New Jersey

March 2006

SECTION I: BACKGROUND

This Engineering Statement has been prepared on behalf of television station WFUT-TV (FCC Facility ID No. 60555), which is licensed to Newark, New Jersey, and operates on analog Channel 68.

On October 24, 2005, the State of New York ("the State") filed with the Commission a Request for Waiver of §90.545 of the Commission's Rules to cause interference to incumbent television stations, in order to permit implementation of a new 700 MHz public safety radio communications system within 12 specified counties in the greater New York City metropolitan area prior to the end of the digital television transition ("Waiver Request").

WFUT-TV is presently licensed (see BLCT-19950901KG) for operation from an antenna located at the top of the mast of the Empire State Building ("ESB") in New York City. That licensed facility, however, pre-dates the events of September 11, 2001. Since that time, television transmitting facilities have been substantially reconfigured at the ESB in order to make room for the numerous stations that have been relocated from the World Trade Center. These changes, along with a modification of the station's lease, forced WFUT-TV to relinquish its licensed facility and obtain a construction permit BPCT-20030805AIL to install a different antenna at a position lower on the

ESB mast, in a shared aperture.[1] As a result, WFUT-TV has not been in service from the ESB since July 2004, and will never be able to operate from the site with its pre-9/11 licensed facilities.

Pending completion and testing of its new ESB antenna and filing of its Form 302-TV Application for License, WFUT-TV operates from its authorized auxiliary (backup) facility BXPCT-20031216ADS atop the 4 Times Square ("4TS") building in New York City. A license application for the auxiliary facility is pending.[2]

SECTION II: THE STATE'S WAIVER REQUEST

The State's Waiver Request proposes to operate mobile and portable radios on certain frequencies within the present TV Channel 69, which is first-adjacent to the authorized operation of WFUT-TV. Furthermore, these mobile and portable operations would occur within the Grade B service area of WFUT-TV. Recognizing the potential for its proposal to cause damaging interference to reception of WFUT-TV and other stations, the State's Waiver Request includes a §90.545 Engineering Study ("Study") which the State asserts satisfies the requirements of §90.545 for protection of WFUT-TV and several other analog and digital TV stations.

While the critique which follows addresses specifically the Engineering Study's analysis of interference which would be caused to WFUT-TV, most if not all of the specific concerns raised herein pertain equally to the evaluation of interference caused to the other analog and digital TV stations considered in the State's analysis.

[1] The Grade B contour from the WFUT-TV construction permit facility at the ESB encompasses 18,023,212 persons per the 2000 Census.

[2] The Grade B contour from the WFUT-TV auxiliary construction permit facility at 4TS encompasses 17,501,222 persons per the 2000 Census.

SECTION III: THE STATE'S ENGINEERING STUDY

To our knowledge, there is no established interference study methodology applicable to the particulars of State's Waiver Request. Specifically, while prior cases such as *Aloha Partners* and *Access Spectrum* have addressed some similar issues, the State's Waiver Request and its underlying Engineering Study bring a new element into play: interference from digital mobile radios into reception of a first-adjacent-channel analog television station. The Commission has not addressed such a situation previously and has not established methodology for analyzing the impact of such operation.

While the State has attempted to graft the techniques used in the prior cases onto this unique situation, it has apparently failed to consider many of the details that make this case different from *Aloha Partners* and *Access Spectrum*. Furthermore, most of the State's technical assumptions are hidden from view, and some of the those assumptions may well be inappropriate. The Study's fundamental failure to properly document its assumptions and the underlying calculations renders its conclusions unreliable at best.

III.A The State's Engineering Study Does Not Meet the Requirements of §90.545

As a threshold matter, the State's Engineering Study fails in its responsibility to analyze interference caused to the relevant TV facilities. Specifically, absent meeting the geographic separation requirements or having a written agreement with the affected stations, §90.545(c)(1)(ii) requires that in order to satisfy the TV/DTV protection requirements a licensee must:

> *...submit an Engineering Study justifying the proposed separations based on the parameters of the land mobile station and the parameters, including authorized and/or applied for facilities, of the TV/DTV station(s) it is trying to protect*
> (emphasis added)

The Engineering Study's analysis of interference caused to WFUT-TV is limited to the licensed facility BLCT-19950901KG, the only facility out of three authorizations held by WFUT-TV that no longer exists. The clear language of §90.545(c)(1)(ii) requires that the State conduct a detailed analysis of the interference caused to the authorized WFUT-TV construction permit facility BPCT-20030805AIL, and to the auxiliary antenna facility BXPCT-20031216ADS, which at this time is the actual operating facility.[3]

Each of the authorized WFUT-TV facilities will have a different Grade B contour location, a different baseline population, and different signal strengths throughout the service area. In order for the State's Study to satisfy the requirements of §90.545, the State must perform an adequate interference analysis of the omitted facilities. As discussed below, that will require more than merely applying the State's current Study methodology to the other two authorized operations of WFUT-TV, as that methodology is clearly flawed.

III.B The State's Engineering Study Methodology is Non-Transparent

Several members of this firm have carefully reviewed the description of the interference analysis conducted by the State's consultant. Our overarching concern with the State's analysis is that it is non-transparent. Several critical elements of the State's technical assumptions go unstated, making it impossible to fully evaluate the accuracy of its calculations.

For the Study's interference analysis to be meaningful, it must be repeatable. An outside party – be that another engineering consultant or the Commission itself – with sufficient

[3] Once its new Empire State Building facility commences full-time operation, WFUT-TV will occasionally utilize the 4TS facility when maintenance work is being performed on the antenna, tower, and beacons at the primary site. When the CP facility at the ESB is licensed, WFUT-TV may find that the overall service from the 4TS facility is better. The new antenna at the ESB is side-mounted and partially obstructed by the supporting tower, whereas the 4TS antenna is top-mounted and is obstructed only by the distant ESB. Should tower obstruction at ESB be found to limit service, WFUT-TV will modify its 4TS facility to become the main transmission site and the ESB facility to become the auxiliary. In either case, both sites will continue to be used – one as the primary and one as the auxiliary antenna. Analysis of interference to service from both sites is therefore pertinent not only to the present, temporary, case, but also to the longer term.

computing resources, time, and the same assumptions should be able to duplicate the results.

What the State's consultant has provided is simply a "black box" with a flow chart printed on its cover. The technical data is input in one end, and out the other end comes a determination of interference or lack thereof. But what is going on inside the box? While we are told that the inner workings apply Longley-Rice techniques to the broadcast station and free-space techniques to the mobile radios, we know little else about their analysis.

The State cites to *Aloha Partners* and *Access Spectrum* as precedent for the applicability of their techniques to its Engineering Study. However, the proponents in both of those cases clearly stated their planning factors.[4] Critically, never once does the Study provide even a single sample calculation that would allow an outside party to determine whether the calculation is being performed correctly, whether consistent units are being used, or even what D/U ratios are being used.

III.C The State's Technical Assumptions for Television Service are Not Specified

The Waiver Request's Engineering Study states on page 17 that for each television station studied the "[m]edian desired field strength at a point in each cell is computed using the Longley-Rice v1.2.2 propagation model, 3-arc second resolution digitized terrain, and the FCC's technical data for the particular broadcaster under study."

With that sentence, the Study begins and ends its description of the technical assumptions used for broadcast station coverage. All we are really told is that the State's consultant used Longley-Rice techniques, a 3-arc-second terrain database, and data taken from the station license.

[4] Moreover, in both cases the Commission imposed a condition that the land-mobile proponent had to resolve any interference whatsoever to television reception caused by its operation. In Aloha, the Commission required that Aloha notify residents within the area of potential interference around each base station of that potential prior to commencing operations; that would not be practical for the mobile operation proposed by the State.

It is grossly insufficient to simply say that one has used Longley-Rice to calculate a TV station's signal strength at discrete locations. The Longley-Rice radio propagation model is used to make predictions of radio field strength at specific geographic points based on the elevation profile of terrain between the transmitter and each specific reception point. This is not a simple calculation with limited input variables. Rather, there are numerous technical assumptions and study parameters that need to be set in a Longley-Rice study, each of which can have a considerable impact upon the final study results.

Different assumptions are appropriate in different circumstances. For example, the Commission's Office of Engineering and Technology ("OET") has published OET Bulletin No. 69 "Longley-Rice Methodology for Evaluating TV Coverage and Interference" ("OET-69"), setting forth very specific technical assumptions and study parameters which should be used in applications for new or modified television station facilities, to demonstrate interference protection to other stations.[5] The OET-69 assumptions are not considered to be universally appropriate in all situations, however. In complying with the statutory requirements of the Satellite Home View Improvement Act of 1999, the Commission selected Longley-Rice techniques to be used to determine whether individual households receive a Grade B signal from terrestrial broadcast stations, but adopted somewhat different technical assumptions for that particular use.[6]

III.C.1 Apparent Reliance on Aloha Partners and Access Spectrum: The only other clue which the State's consultant supplies regarding its unspecified Longley-Rice study assumptions is a passing reference to the *Aloha Partners* and *Access Spectrum* cases:

[5] It should be noted that the introductory paragraph of OET-69 makes clear that it is to be used for "evaluating TV service coverage and interference in accordance with Sections 73.622, 73.623 and 74.704 of the FCC rules." Nowhere is there an indication that OET-69 would be appropriate for use in a §90.545 interference analysis such as the instant case.

[6] See the First Report & Order in ET Docket No. 00-11, "Establishment of an Improved Model for Predicting the Broadcast Television Field Strength Received at Individual Locations," released on May 26, 2000.

> *...waiver requests initiated by commercial operators for the purpose of opening the lower 700-MHz spectrum to new services are now reaching the Commission. These preceding protection analysis methodologies contain modeling and evaluation approaches and parameter values that have either influenced or been incorporated into this Engineering Study.*[7]

Despite this reference to the "prior art", the Engineering Study provides no detail as to which "parameter values" they have adopted from *Aloha Partners* and *Access Spectrum*, which parameters they have modified, and why.

Indeed, if *Aloha Partners* and *Access Spectrum* were considered the models for this type of analysis, the Engineering Study falls far short of emulating the transparency and repeatability of the calculations in those prior cases. In both of those cases, the proponents utilized Longley-Rice methodology to calculate the received signal strength from a television station, and went into great detail describing the technical assumptions they made, assumptions which were often quite different from those used in (for example) OET-69.

Among the Longley-Rice study technical assumptions provided by *Aloha Partners* and *Access Spectrum* were: time and location variability, use of land cover attenuation, receiving antenna directionality, receiving antenna gain, and receiving antenna height above ground.[8] *Aloha Partners* and *Access Spectrum* also provided sample calculations. By contrast, the State has revealed none of its corresponding assumptions within the Engineering Study's "black box", and has not provided a single sample calculation.

[7] Engineering Study at 13. The sentences quoted include numeric references (omitted above) to the *Aloha Partners* and *Access Spectrum* cases listed in the Study's section 4.4 "References".

[8] It should be noted that even *Aloha Partners* and *Access Spectrum* differed somewhat in their study assumptions. For example, *Aloha Partners* assumed a television receive antenna height of 6 feet above ground, while *Access Spectrum* assumed 1.5 meters (5 feet).

III.C.2 Over-reliance on Aloha Partners and Access Spectrum Would Be Inappropriate In This Case: While the State cites *Aloha Partners* and *Access Spectrum* as precedent for the applicability of these techniques to their Waiver Request, it is not an insignificant fact that those cases involved only fixed-into-fixed interference. The waiver request portion of both cases involved only fixed broadband transmitters; mobile use only occurred on frequencies unrelated to the waiver requests. The State's Engineering Study does not cite to (and we are unaware of) any relevant precedent which supports the use of these specific techniques and assumptions for the mobile-into-fixed interference which the State's mobile and portable radios would cause to reception of WFUT-TV.

Mobile-into-fixed interference is a different "animal" from fixed-into-fixed interference. Mobile-into-fixed interference is intermittent, it is widespread, it is annoying, and it is almost impossible for the consumer to identify and mitigate. Consequently, the imposition of a requirement that the State resolve individual interference complaints (such as offering filters to affected viewers, as in *Aloha Partners*) would be impossible to put into effect, and would therefore do nothing to resolve the actual interference problems caused by the State's mobile radios.

It is a near certainty that somewhat different technical assumptions would be appropriate for evaluation of the mobile-into-fixed interference that the State's proposed system would cause to reception of WFUT-TV. Perhaps the State's consultant reached the same conclusion, and modified its assumptions accordingly, but this is impossible to ascertain because the Engineering Study is silent on the subject of its Longley-Rice technical assumptions.

III.C.3 Examples of How Erroneous Assumptions Could Bias the Results: Utilization of erroneous or inappropriate Longley-Rice study assumptions can introduce significant bias into the study results, leading to a substantial under-reporting of the population which will be subject to interference from the State's mobile radio system. The two examples

which follow are by no means comprehensive, but illustrate the magnitude of the potential problem.

Example 1: Time and Variability Assumption: It is noted that both Aloha Partners and Access Spectrum elected to calculate the incumbent television station's received signal strength in the vicinity of their (proposed) fixed base stations using 90% time and 90% location variability ("F(90,90)"). This choice offered a "worst-case" assumption when compared with the 50% time and 50% location variability ("F(50,50)") assumed in an OET-69-compliant television service study. For example, where an OET-69-compliant study would predict that a given location has a 100 dBu F(50,50) signal strength, the use of 90% time and location variability could drop that predicted signal strength to 88 dBu F(90,90).

However, both *Aloha Partners* and *Access Spectrum* involved a limited number of discrete fixed stations,[9] all of which were located in areas where the incumbent television station maintained a very high signal strength, i.e. much higher than Grade B. Consequently there was no consideration given as to whether the nearby households might be above or below the Grade B service level. Indeed, there was no risk that that would be the case.

In stark contrast, the State's proposal involves hundreds of mobile radios, which will operate out to the fringes of WFUT-TV's Grade B service. The Engineering Study notes that any households[10] which do not receive at least a Grade B signal from the TV station have been excluded from further study:

> *The TV signal level may be less than the Grade B threshold in some study area cells because of irregular terrain blockage. There is no practicality of*

[9] Access Spectrum proposed seven fixed stations in the Tucson area, while Aloha Partners involved a single fixed station in Houston.

[10] More specifically, the Engineering Study refers to "cells", i.e. regularly-spaced geographic units which are 3-arc seconds on a side. Each cell may encompass zero, one, several, or even hundreds of households, depending upon population distribution and the cells' intersection with US Census block centroid data.

> *interference protection to a TV receiver that lacks sufficient broadcast signal to demodulate desired information content in the first place. Thus "reception of service" is another central element for evaluating the size of the affected viewer population.*[11]

If the State's Engineering Study relied upon the F(90,90) time and location variability previously utilized in *Aloha Partners* and *Access Spectrum*, then this would serve to exclude from further study nearly 800,000 persons who would normally be predicted to receive a Grade B signal from WFUT-TV under an F(50,50) assumption.[12] These are persons who are considered to be able to receive WFUT-TV in any Media Bureau coverage study conducted according to OET-69. Furthermore, these are the persons who would be the most susceptible to interference from the State's mobile radio system, because they are already on the fringe of being able to receive a satisfactory signal from WFUT-TV.

Example 2: Vertical Plane Pattern Assumption: Another example of a technical assumption with significant effect upon the study results would be the selection of a vertical plane elevation pattern to the WFUT-TV transmitting antenna. Use of an appropriate vertical plane pattern is critical in a case such as this where a large population lives within close proximity to (and at steep depression angles from) the WFUT-TV transmitting antenna.

A typical high-power UHF television transmitting antenna does not radiate its power equally at all vertical angles. Such an "isotropic" antenna, even if it was possible to construct, would be incredibly inefficient. Rather, the design of a UHF television antenna

[11] Engineering Study at 13.

[12] To arrive at this result, this firm performed an OET-69-compliant (but using the actual vertical plane pattern and mechanical beam tilt) Longley-Rice coverage prediction for the WFUT-TV construction permit facility under an F(50,50) assumption, and then repeated the calculation using an F(90,90) assumption. The Grade B (dipole adjustment factor included) service levels were 16,876,660 persons for F(50,50) and 16,077,788 persons for F(90,90).

concentrates most of its energy towards the horizon, while limiting radiation at steep angles (more than 10 degrees below the horizontal) to a mere fraction of the power in the main lobe.

Neither *Aloha Partners* nor *Access Spectrum* needed to consider the vertical pattern of the television transmitting antenna, because in both of those cases the television station's transmitting antenna was located in a rural area a significant distance from the few discrete interference locations under study.[13] Thus, the depression angles from the television antenna to the interference locations were very shallow, placing those locations in the main beam of the television vertical plane pattern.

For a transmitting antenna operating from a typical rural or mountain-top site, the vertical plane pattern differences more than 10 degrees below the horizontal would not be of particular significance, since these steep depression angles would fall primarily over thinly-populated areas.

WFUT-TV, by contrast, operates from atop a building in the middle of the most densely-populated urban center in the country; according to 2000 Census data, Manhattan Island has a population density of 25,710 persons per square kilometer.[14] So unlike most television stations in other parts of the country (but like other television stations in New York City, Chicago, and some other major metropolitan areas) WFUT-TV serves a large population in close proximity to the antenna site.

The State's consultant cites *Aloha Partners* and *Access Spectrum* as influencing the "evaluation approaches and parameter values" of its own study. But since neither of those

[13] In *Aloha Partners*, the transmitting facility (and thus the relevant interference area) for station KWBA(TV) was located 45 kilometers from the nearest of the fixed transmitters. In *Access Spectrum*, the transmitting facility (and thus the relevant interference area) for station KZJL(TV) was located 26 kilometers from the lone fixed transmitter.

[14] Contiguous with New York County, Manhattan Island has an area of 59.79 square kilometers and a 2000 Census population of 1,537,195 persons.

cases needed to consider the TV transmitting antenna vertical pattern, and since the State has not revealed what assumption it has made about the WFUT-TV transmitting antenna vertical pattern, it is impossible to say just how much their assumption might have biased the results of the Engineering Study.

Three possible assumptions come to mind: 1) assumption of an isotropic antenna, radiating equally in all directions, 2) assumption of the standard vertical plane pattern used in OET-69, and 3) use of the actual WFUT-TV vertical plane pattern. Either of the first two assumptions would be wholly inappropriate in this situation, and would dramatically overstate the WFUT-TV signal strengths within a few miles of the transmitting antenna.

Assumption of an isotropic antenna would lead to a wildly erroneous result. For example, a hypothetical household located at a 45 degree depression angle from the WFUT-TV auxiliary antenna would be considered to have the full 3000 kW (34.77 dBk) main lobe power pointed at it. The actual WFUT-TV auxiliary antenna has a relative field value of 0.029 at 45 degrees down, which equates to only 2.5 kW (3.98 dBk) pointed at this hypothetical household. Thus, assumption of an isotropic antenna would overstate the desired signal at this household by almost 31 dB, falsely making it appear that this household was much less susceptible to interference from the State's mobile radio system.

Assumption of the standard vertical plane pattern used in OET-69 would be a slight improvement, but would still be overly-simplistic and would still yield an erroneous result. Table 8 of OET-69 lists the assumed vertical plane radiation patterns which the FCC utilized for transmitting antennas in developing the original DTV table of allotments,[15] and

[15] OET-69 states that the vertical plane patterns listed in that document are considered to be "typical patterns." The Commission's assumption of these values may well have been appropriate in the aggregate, for the evaluation of over 1500 existing analog stations and over 1500 new digital stations, not to mention evaluation of the impact of the new digital stations on existing LPTV and TV translator stations. Since TV station vertical plane patterns have not historically been included in the engineering databases, the Commission needed to make some blanket assumptions in order to conduct their iterative study of thousands of interference scenarios.

which continue to be used for evaluating applications for new and modified stations. For a UHF analog station, the assumed vertical plane radiation pattern is:

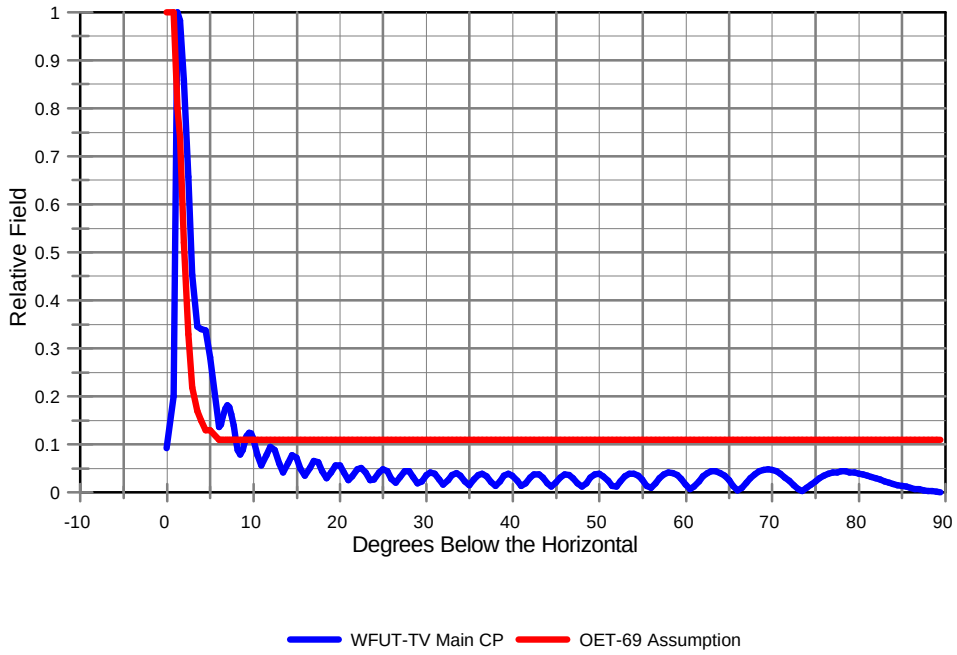
Depression Angle	Relative Field Value
0.75	1.000
1.50	0.740
2.00	0.520
2.50	0.330
3.00	0.220
3.50	0.170
4.00	0.150
5.00	0.130
6.00	0.110
7.00	0.110
8.00	0.110
9.00	0.110
10.00	0.110

While the OET-69 assumption is a relative field of 0.11 at all angles more than 10 degrees below the horizontal, the antennas authorized in WFUT-TV construction permit BPCT-20030805AIL and auxiliary permit BXPCT-20031216ADS have much lower relative field values at angles more than 10 degrees below the horizontal than the OET-69 assumption. The WFUT-TV construction permit facility relative field values at those angles range from 0.001 to 0.096, with a median relative field value of 0.034. The operating WFUT-TV auxiliary permit facility relative field values at those angles range from 0.001 to 0.071, with a median relative field value of 0.028.

The graphs on the following page compare the actual authorized WFUT-TV vertical plane elevation patterns against the simplistic OET-69 assumption.

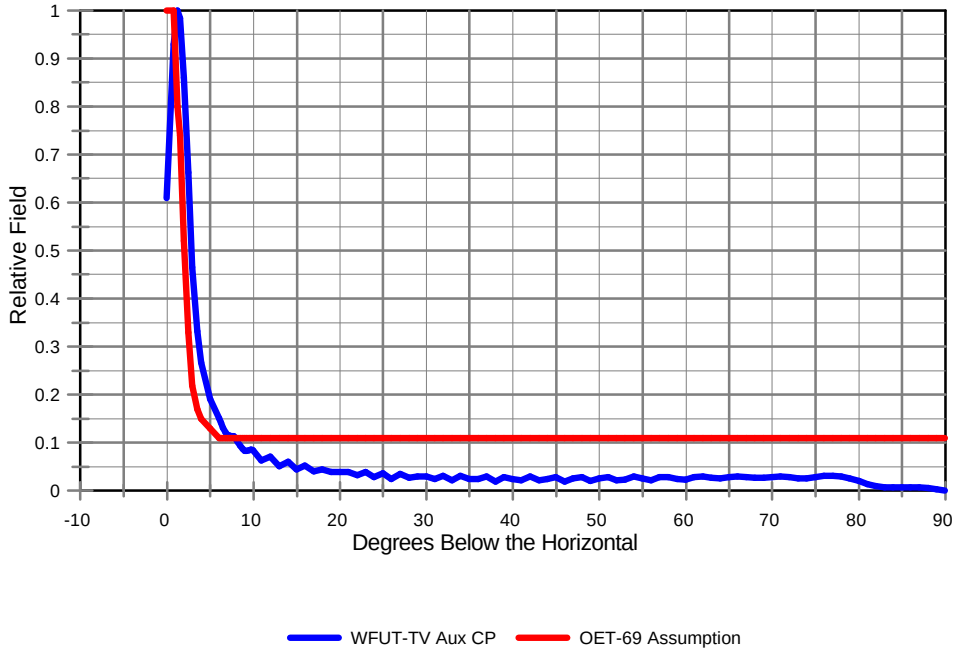
Comparison of Vertical Plane Patterns

WFUT-TV Main CP vs OET-69 Assumption



Comparison of Vertical Plane Patterns

WFUT-TV Aux CP vs OET-69 Assumption



Consider a cone extending outward from the WFUT-TV construction permit antenna at 437 meters above ground, with the antenna at the point of the cone and the slope of the cone at 10 degrees below the horizontal. Such a cone would extend a horizontal distance of 2.5 kilometers from the Empire State Building, and encompass a 2000 Census population of over 375,000 persons. The use of the standard OET-69 vertical plane pattern assumption (0.11 relative field at depression angles greater than 10 degrees) overstates the desired signal strength provided to this population by 10 dB when compared with the median relative field value of 0.034 at these angles from the actual antenna. At many depression angles the difference is even more pronounced. Use of the standard OET-69 vertical plane pattern would falsely make it appear that these 375,000 persons were much less susceptible to interference from the State's mobile radio system.

A similar cone extending from the WFUT-TV auxiliary permit antenna at 351 meters above ground would extend a horizontal distance of 2 kilometers from 4 Times Square, and encompass a 2000 Census population of over 224,000 persons. The use of the standard OET-69 vertical plane pattern assumption (0.11 relative field at depression angles greater than 10 degrees) overstates the desired signal strength provided to this population by 12 dB when compared with the median relative field value of 0.028 at these angles from the actual antenna. At many depression angles the difference is even more pronounced. Use of the standard OET-69 vertical plane pattern would falsely make it appear that these 224,000 persons were much less susceptible to interference from the State's mobile radio system.

Furthermore, the WFUT-TV main and auxiliary construction permit facilities are authorized to operate with both electrical and mechanical beam tilt.[16] This further affects the received signal strengths at almost all azimuths. To illustrate this point, this firm has conducted a

[16] For both WFUT-TV permits, there is 1.25 degrees of electrical beam tilt, with 0.5 degrees of mechanical beam tilt added at an azimuth of 80 degrees True. The horizontal plane patterns of the two permits are identical, but different vertical plane patterns are used since the auxiliary antenna is longer than the main construction permit antenna.

study which compares the predicted Longley-Rice signal strength from the State's assumption of the WFUT-TV licensed facility and OET-69 vertical plane radiation pattern, with the more appropriate assumption of the WFUT-TV main and auxiliary construction permit facilities and the actual vertical plane radiation patterns including mechanical beam tilt.[17]

The results of this study are shown on the attached map exhibits. Three levels of red shading indicate areas where the studied actual WFUT-TV facility predicted signal strength is 1 to 5 dB, 5 to 10 dB, and 10+ dB weaker than that of the State's assumed facility.

It is easy to see from even a casual review of these map exhibits that erroneous assumptions about the transmitting facility have huge effects upon predicted desired signal strength. Comparing the State's assumption of the WFUT-TV license facility (with OET-69 vertical plane pattern) against the actual WFUT-TV construction permit facility, many areas including the densely populated core of Manhattan Island see a significant decrease in predicted signal strength when the erroneous assumptions are removed from the calculation. Over 3.4 million persons inside the WFUT-TV Grade B contour see a signal strength decrease of at least 1 dB using the WFUT-TV construction permit facility on the Empire State Building. Over 4 million persons inside the Grade B contour see a signal strength decrease of at least 1 dB using the operational WFUT-TV auxiliary construction permit facility at 4 Times Square.

In order to present a more accurate picture of the interference effect which the proposed mobile and portable radio use will have upon the service provided by WFUT-TV, the

[17] These studies have been prepared using the Longley-Rice v1.2.2 code as implemented in the SIGNAL v9.0 software program from EDX Wireless, LLC. Terrain data was extracted from the 3-arc-second terrain database at 0.1 km increments, and the results calculated for cells that are 0.25 km on each side. Signal strength has been "clipped" at the Grade B level of 66.25 dBu (-66.8 dBmW) for Channel 68. Receiving antenna directionality was not considered relevant to this particular study, which was designed primarily to reflect signal strength differences resulting from vertical plane pattern and technical facility assumptions. Other relevant study assumptions are listed in the text block on the map exhibits.

State's Engineering Study must utilize the actual WFUT-TV vertical plane radiation patterns, as well as the mechanical beam tilt. Otherwise, the result would be a dramatic overstatement of the WFUT-TV signal strength at locations close in to the transmitter site, and a consequent undercounting of the population which would receive interference from the State's proposed mobile radio system. Data on the WFUT-TV antenna vertical plane radiation patterns and beam tilt is available from the Form 301 applications for those facilities, information which is readily accessible in the Commission's CDBS database.

III.D The State's D/U Ratio Assumptions are Not Specified and May Be Inappropriate

§90.545(a)(2) of the Commission's Rules specifies a minimum D/U ratio for adjacent channel operations of 0 dB at the Grade B contour of incumbent analog television stations. The State's Engineering Study abandons the D/U ratio specified in the Commission's Rules, choosing instead to apply a variable D/U ratio as a function of the desired signal level, citing to FCC/OET Report TM87-1, Figure 4. The Study describes a bilinear interpolation of Figure 4 allegedly used to arrive at intermediate D/U protection values. "The outcome," states the Study, "is a computerized lookup table of interference levels, desired signal levels, and the corresponding D/U criteria. There is a further benefit of more pertinent D/U ratios aligned with strong moderate, and weak television signal conditions."[18]

What are the Engineering Study's derived D/U ratios at varying levels of desired signal? Unlike *Aloha Partners* and *Access Spectrum*, both of which explicitly stated their D/U ratios, the State's Study simply doesn't say. Nowhere is there a table provided listing D/U ratios at incremental levels of desired signal. Nowhere are there a few sample D/U ratios at the "strong, moderate, and weak television signal conditions" the State's consultant mentions in the Engineering Study. Nowhere is there even a single actual D/U ratio cited to demonstrate that the State's consultant applied Figure 4 correctly.[19]

[18] Engineering Study at 19

[19] Careful review of the State's Engineering Study shows that specific D/U criteria are mentioned only twice, in both cases (page 20 and page 23) with regard to co-channel situations. WFUT-TV is a first-adjacent channel situation.

All of the first-adjacent-channel D/U ratios utilized by the Engineering Study are hidden inside the "black box", where nobody can access them, and where they are impossible to review.

The source of the State's D/U ratios may be inappropriate, in any case. The conclusions reached in FCC/OET Report TM87-1 were based on measurements of the impact of analog FM (20K0F3E) modulation in the UHF land mobile band. However, the OpenSky mobile and portable radios that will be used in the State's Statewide Wireless Network use Filtered 4-Level Gaussian Frequency Shift Keying Modulation ("F4GFSK"), which is a digital modulation format.

The application of the FCC/OET Report TM87-1 conclusions may therefore not be appropriate for interference from a digital radio system into an analog television system. The State has not demonstrated any basis for assuming that the analog D/U ratios derived from FCC/OET Report TM87-1 are appropriate for this form of digital modulation.

Furthermore, the proposed New York State network will be a four-slot implementation of M/A-COM's OpenSky technology,[20] which uses Time Division Multiple Access ("TDMA") to increase the voice path capacity on each channel. The mobile side of TDMA systems use 1/4 of the time in each channel. This adds an additional low frequency pulsing to the interfering signal which causes the threshold of visibility in the consumer's television receiver to increase. Other TDMA devices, such as cell phones, have been observed to causes more "blanketing" interference effects than other digital modulation schemes. These blanketing interference effects have been observed on devices that are operating on widely separated frequencies, so we expect that the interference effects would be worse for an adjacent channel situation. We anticipate that this will be a problem for this proposed system. Research should be conducted to determine the appropriate D/U ratios for this type of system into analog television reception.

[20] Source: "New York to get Massive Network", *Mobile Radio Technology*, December 2005.

III.E. The State's Mobile Transmitter Study Assumptions are Not Specified

Several of the State's assumptions regarding the use of the mobile radios are either unknown or inappropriate. Additional information must be provided to enable the Commission and WFUT-TV to properly evaluate the validity of the Engineering Study.

III.E.1 The State's Mobile Signal Strength Calculations are Undocumented: The free-space path loss calculation formula shown on page 18 of the State's Engineering Study, which is used to calculate the path loss between the mobile radios and the TV receiving antennas assumed in the analysis, is based on an isotropic antenna gain reference (gain in dBi) for the mobile radio and TV antennas. The antenna gain specifications for mobile radio antennas in the LMRS service and for television receiving antennas in the broadcast service are generally specified with a dipole reference (gain in dBd). The antenna gain figures assumed in the Commission's UHF TV planning factors and in any meaningful analysis of the potential for interference to television receivers also have a dipole gain reference.

Use of the isotropic free-space equation to calculate the path loss between two antennas that have gains referenced to a dipole would overestimate the path loss between the two antennas by 4.3 dB, thereby underestimating the power of the undesired signal level by the same amount.

Since no sample calculations have been provided in the Study, there is no way to look at each gain and loss component in the D/U ratio calculation (from the output of the mobile radio to the input of the television receiver) to determine if the loss and gain components have consistent units and yield the correct results for interfering power levels at the receiver, assuming a given output power at the mobile transmitter.

III.E.2 The Radius Studied From Each Mobile Transmitter is Unknown: It is unclear from the State's Engineering Study just how far the study area extends from each presumed (and iterated) mobile transmitter location. The minimum study radius should be

the distance corresponding to the minimum interfering signal strength from the mobile transmitter for 30 Watts ERP and free space propagation. The Engineering Study is as silent regarding the mobile transmitter study radius as it is on its D/U ratios.

III.E.3 Assumption of Countywide Random Distribution of Mobile Radios is Inappropriate: The State's consultant indicates that it conducted an iterative study of the interference from the mobile receivers into WFUT-TV, with 1000 scenarios of randomly-located mobile transmitters throughout the 12-county area. Unfortunately, this simply does not reflect the real-world usage of the mobile radios.

Page 16 of the Study states that "The distribution over a county's area is uniform because public safety must be ubiquitous; that is no particular road, village, or other real property receives a biased preference for or against potential operations."

The Waiver Request, however, goes to great length emphasizing the need for deployment of these frequencies for use by the Metropolitan Transit Authority ("MTA"). Indeed, over five pages are dedicated to discussing the MTA's need for these frequencies. MTA radio usage would most certainly not be truly uniformly distributed throughout the 12-county area. In the real world, one can expect that the usage of MTA mobiles will be distributed along the rail rights-of-way and bus lines, with clustering around the system terminals, which are generally located in higher-population-density areas. Therefore, the use of MTA mobiles – and the interference caused by those mobiles – will be more likely to affect consumers in and around the rail rights-of-way, bus lines, and system terminals, where the population density is the highest.

While ubiquitous county-wide service may be a desirable public safety radio system design goal, the simple statistical likelihood is that more public safety radio traffic will originate from higher-population-density areas. If you are going to protect life and property, you have to be where the life and property are located.

Given that MTA mobile radio usage will not be uniformly distributed throughout the 12 counties, what the State must satisfactorily demonstrate in its Engineering Study is that the anticipated usage of its system will not cause damaging interference to reception of WFUT-TV, or that of any of the other analog and digital TV stations in the study. While some accommodation should certainly be made to account for officer transit between the routes and locations outlined above, the distribution of mobiles – while random – should be grouped along MTA rights-of-way, weighted for population density.

III.E.4 The Number of Mobile Radios In Each Study Should Be Increased: Another aspect of the State's evaluation of its 1000 iterated scenarios of mobile radio transmitter interference is clearly biased to produce a small result. Each of the scenarios is considered to be complete in and of itself, contributing equally to what is effectively an average interference population.

What the State studied, however, were simultaneous transmissions, which we can also term instantaneous transmissions. In other words, the State calculated how many persons would be subject to interference at any given instant. But each of the mobile radios would move around during the course of the day, and would likely be used at multiple locations during the course of the day, thereby causing interference in several locations. It would be far more telling to know how many persons would be subject to interference over a longer span of time, for example over the course of an entire day. This could be accomplished by significantly increasing the number of mobile transmitters included in each scenario.

III.E.5 Simultaneous Transmission Count Issue: An additional concern is that the potential number of simultaneous transmissions shown in the Engineering Study assumes that each transmission will occupy a single 700 MHz RF channel. However, the proposed New York State network will be a four-slot implementation of M/A-COM's OpenSky technology, which uses Time Division Multiple Access ("TDMA") to increase the voice path capacity on each channel.

Under normal operating conditions, the individual mobiles assigned to the four time slots in any given channel will be randomly distributed around the serving base station site, and will likely be in motion. The actual number of mobiles potentially active on a given site will depend upon the number of RF channels assigned to that site. By assuming an "average" number of transmit channels per site, which may differ markedly from the actual number of channels used at each site in a final system design, and by assuming a single mobile transmission per RF channel, the Study "spreads out" the potential for interference. In a real-world land mobile system which may have fewer or more channels than the average assumed in the Study, the potential for interference would be higher around sites with more channels. This is not reflected in the Study submitted.

IV. CONCLUSIONS

The State's Engineering Study falls flat with its first step, failing to satisfy the requirements of §90.545 by omitting any study of the two authorized WFUT-TV CP facilities, including the station's current operating facility. The only WFUT-TV facility studied was the licensed facility, which is the only one out of three authorizations held by WFUT-TV that no longer exists. The study must be repeated for the omitted facilities, utilizing the actual technical parameters of those facilities, including the actual vertical plane radiation patterns and mechanical beam tilt.

It would have been a simple matter for the State's consultant to list the interference analysis assumptions contained within the Engineering Study's "black box", but it did not do so. Erroneous assumptions about the relevant technical facility, the vertical plane radiation pattern, receiving antenna directivity, time and location variability, receiving antenna height, etc., have led to an erroneous result, i.e. a mis-reporting of the WFUT-TV service population which would be subject to interference from operation of the mobile radios. It is imperative that the State fully disclose and justify its study assumptions, and include sample calculations, to ensure the transparency of its Engineering Study. The D/U ratios utilized must be documented and justified, particularly considering that the State has chosen to not use the D/U ratio specified in §90.545, and also considering that the reputed source for D/U ratios was not designed for the evaluation of interference from digital radios.

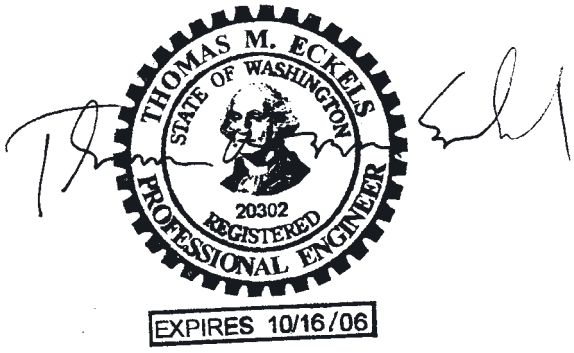
Finally, the distribution of the mobile radios in each iterated study must be weighted to reflect anticipated usage of the system. Distribution should be random, but grouped along MTA rights-of-way, weighted for population density. The number of mobile radios included in each simulation should be increased to account for the fact that each mobile will move around and cause interference in multiple areas during the course of the day.

Lacking more explicit information on how the State's consultant performed its interference study calculations, as well as studies of all of WFUT-TV's authorized operations, it is impossible for either the Commission or WFUT-TV to rely with any certainty on the results of the State's Engineering Study.

V. STATEMENT OF ENGINEERS

This Engineering Statement supporting Comments in WT Docket No. 06-18, Regarding the State of New York's Request for Waiver of §90.545 of the Commission's Rules, has been prepared on behalf of WFUT-TV. All representations herein are true to the best of our knowledge, and we hereby declare that the facts set out in the foregoing Engineering Statement, except those of which official notice may be taken, are true and correct. We are experienced radio engineers whose qualifications are a matter of record with the Federal Communications Commission. Mr. Lockwood is a partner in the firm of Hatfield & Dawson Consulting Engineers and is Registered as a Professional Engineer in the States of Washington and Alaska. Mr. Eckels is a partner in the firm of Hatfield & Dawson Consulting Engineers and is Registered as a Professional Engineer in the States of Washington and Colorado.

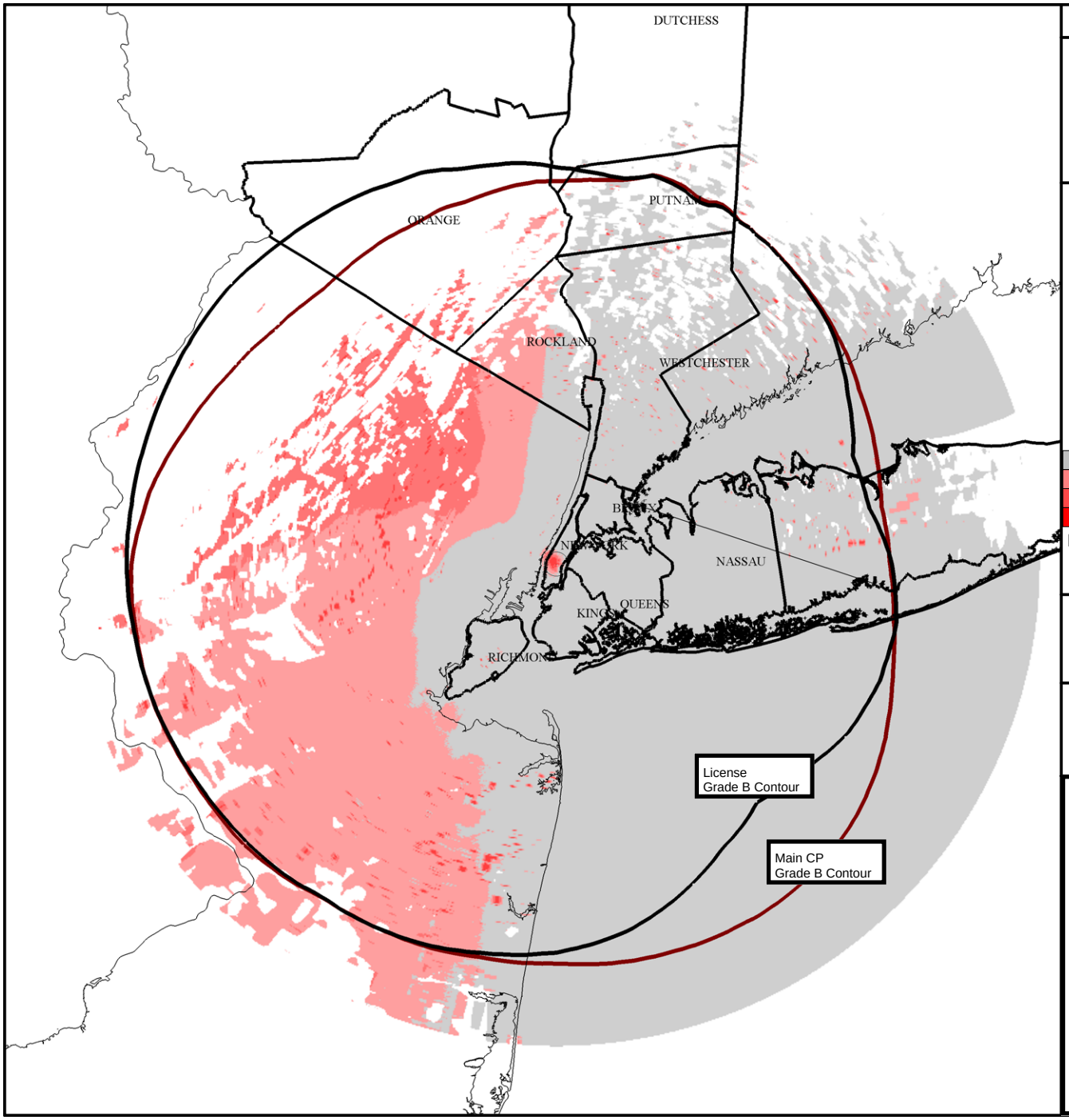
Signed this 10th day of March, 2006.



Stephen S. Lockwood, P.E. Thomas M. Eckels, P.E.

Erik C. Swanson, E.I.T.

MAP EXHIBITS



SIGNAL™: WFUT-TV Newark

Prop. model 1: Longley-Rice v1.2.2
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 0.0dB
Climate: Continental Temperate
Land use (clutter): none
Atmospheric Abs.: none
K Factor: 1.333

Sites

Site: cp
N40°44'54.00" W73°59'10.00" 15.0 m
cp Tx.Ht.AGL: 422.0 m Total ERPd: 34.20 dBkW
Model: 1 directional-horizontal/0.0° 797.0000 MHz

Site: lic
N40°44'54.00" W73°59'10.00" 16.0 m
lic * Tx.Ht.AGL: 436.0 m Total ERPd: 34.20 dBkW
Model: 1 directional-horizontal/0.0° 797.0000 MHz

C/I ratio Primary Group TXs to Second Group TXs

>	-1.0 dB
	-5.0 to -1.0 dB
	-10.0 to -5.0 dB
<	-10.0 dB

Display threshold level: -66.8 dBmW
RX Antenna - Type: OMNI
Height: 9.1 m AGL Gain: 0.00 dBd

KILOMETERS
-25 0 25

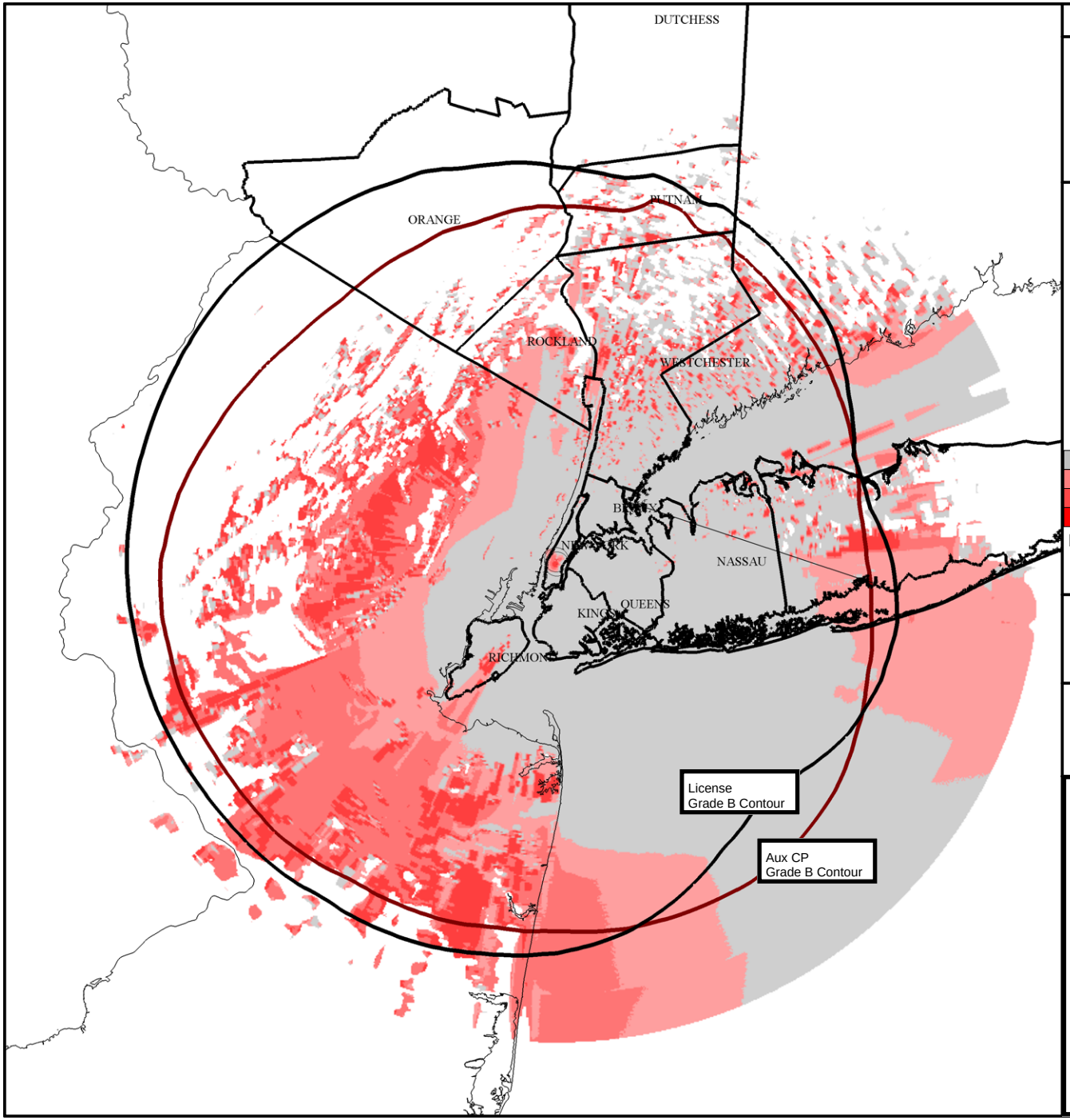
WFUT-TV Main CP vs License OET-69

Hatfield & Dawson

Exhibit Mar 2006

This map depicts the results of a study which compares the predicted Longley-Rice signal strength from an assumption of the WFUT-TV licensed facility and OET-69 vertical plane pattern, with the more appropriate assumption of the WFUT-TV main CP facility and the actual vertical plane pattern including mechanical beam tilt.

Gray shading indicates areas where the difference between the two facility assumptions is less than 1 dB, which is not statistically significant. Three levels of red shading indicate areas where the authorized WFUT-TV facility predicted signal strength is 1 to 5 dB, 5 to 10 dB, and 10+ dB weaker than that of the State's assumed facility.



SIGNAL™: WFUT-TV Newark

Prop. model 1: Longley-Rice v1.2.2
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 0.0dB
Climate: Continental Temperate
Land use (clutter): none
Atmospheric Abs.: none
K Factor: 1.333

Sites

Site: 4ts
N40°45'22.00" W73°59'12.00" 15.0 m
4ts Tx.Ht.AGL: 336.0 m Total ERPd: 34.77 dBkW
Model: 1 directional-horizontal/0.0° 797.0000 MHz

Site: lic
N40°44'54.00" W73°59'10.00" 16.0 m
lic * Tx.Ht.AGL: 436.0 m Total ERPd: 34.20 dBkW
Model: 1 directional-horizontal/0.0° 797.0000 MHz

C/I ratio Primary Group TXs to Second Group TXs

>	-1.0 dB
	-5.0 to -1.0 dB
	-10.0 to -5.0 dB
<	-10.0 dB

Display threshold level: -66.8 dBmW
RX Antenna - Type: OMNI
Height: 9.1 m AGL Gain: 0.00 dBd

KILOMETERS
-25 0 25

WFUT-TV Aux CP vs License OET-69

Hatfield & Dawson

Exhibit Mar 2006

This map depicts the results of a study which compares the predicted Longley-Rice signal strength from an assumption of the WFUT-TV licensed facility and OET-69 vertical plane pattern, with the more appropriate assumption of the WFUT-TV auxiliary CP facility and the actual vertical plane pattern including mechanical beam tilt.

Gray shading indicates areas where the difference between the two facility assumptions is less than 1 dB, which is not statistically significant. Three levels of red shading indicate areas where the authorized WFUT-TV facility predicted signal strength is 1 to 5 dB, 5 to 10 dB, and 10+ dB weaker than that of the State's assumed facility.

Note that the auxiliary facility is the actual operating WFUT-TV facility.